

Patent claims

1. Windscreen wiper system for vehicles, particularly for motor vehicles with at least three connections at intervals from one another for screw-free installation of a windscreen wiper system (1) or a carrier (2) of this system on a vehicle bodywork, with the fixings consisting respectively of a fixing element (13, 13a) which can be pushed into an attachment or fixing hole (16) where it can be anchored by engagement and with at least one fixing element having a grommet (19, 19a) in elastic material which can be inserted into the attachment or fixing hole, designed with at least one projection (23) acting as a catch, **characterised by the fact**, that on the grommet in the area of the projection (23), at least one cavity (24, 25) is arranged radially inwards opposite the projection with reference to a grommet axis (AT).
2. Windscreen wiper system according to claim 1, characterised by the fact that the cavity is a cutout, for example a circular groove-like cutout (24).
3. Windscreen wiper system according to claim 2, characterised by the fact that the cavity is a cutout (24) open towards the circumference of the grommet (19).
4. Windscreen wiper system according to one of the above claims, characterised by the fact that the cavity (24) has an extension stretching under the at least one projection (23).
5. Windscreen wiper system according to one of the above claims, characterised by the fact that the cavity (24) on the circumferential area of the grommet (19) is open near the locking area (23.1).
6. Windscreen wiper system according to one of the above claims, characterised by the fact that the at least one projection is a circular-shaped projection (23)

concentrically enclosing the grommet axis (AT).

7. Windscreen wiper system according to one of the above claims, characterised by the fact that the cavity (25) is formed by a section (20.1) of the grommet opening with an enlarged cross-section.
8. Windscreen wiper system according to one of the above claims, characterised by the fact that the grommet (19, 19a) is manufactured from an elastic rubber material, for example from rubber or an elastic rubber plastic.
9. Windscreen wiper system according to one of the above claims, characterised by the fact that the grommet (19, 19a) forms a further contact surface (21) axially distanced from the at least one locking area (23.1) and that the axial distance between these further contact surfaces (21) on the grommet side and the at least one locking area (23.1) are at the most equal to or less than the axial distance between a first surface gripped from behind at the attachment or fixing hole (16) formed by the locking area (23.1) and a second surface formed at the attachment or fixing hole (16) which lies against the further contact surface on the grommet side (21).
10. Windscreen wiper system according to claim 9, characterised by the fact that the further contact surface on the grommet side is formed by a flange-like grommet section (21) projecting over the circumference of the grommet.
11. Windscreen wiper system according to one of the above claims, characterised by the fact that the grommet (19, 19a) is arranged without possibility of axial displacement on a peg (17) or section of peg (17.2) of the fixing element (13, 13a).
12. Windscreen wiper system according to claim 11, characterised by the fact that the grommet (19, 19a) is safeguarded by back cuts between the peg (17) and

grommet (19, 19a) axially on the peg (17).

13. Windscreen wiper system according to claim 12, characterised by the fact that the peg (17) or the peg section (17.2) has at least one groove (18) to accept the grommet (19).
14. Windscreen wiper system according to one of the above claims, characterised by the fact that the fixing elements (13, 13a) are at least arranged in part on the windscreen wiper system (1) or on an element (8, 9, 14) of the windscreen wiper system (1) and the corresponding fixing or attachment openings are arranged on the bodywork side.
15. Windscreen wiper system according to one of the above claims, characterised by the fact that the fixing elements (13, 13a) are at least arranged in part on the bodywork side and the corresponding fixing or attachment openings (16) on the windscreen wiper system (1) or on a functional element (8, 9, 14) of the windscreen wiper system (1).
16. Windscreen wiper system according to one of the above claims, characterised by the fact that the volume (V24, V25) of the at least one cavity (24, 25) is at least equal to the volume (23) of the projection (23).
17. Fixing element for screw-free installation of a windscreen wiper system (1) for vehicles, particularly for motor vehicles on vehicle bodywork, in which the fixing element (13, 13a) which can be pushed into an attachment or fixing hole (16) and be anchored there by engagement, has a grommet (19, 19a) made of an elastic material, which can be inserted into the attachment or fixing hole and is designed for engagement with at least one projection (23) acting as a catch, **characterised by the fact**, that on the grommet in the area of the projection (23), at least one cavity (24, 25) is arranged radially inwards opposite the projection with reference to a

grommet axis (AT).

18. Fixing element according to claim 17, according to claim 1, characterised by the fact that the cavity is a cutout, for example a circular groove-like cutout (24).
19. Fixing element according to claim 18, characterised by the fact that the cavity is a cutout (24) open towards the circumference of the grommet (19).
20. Fixing element according to one of the above claims, characterised by the fact that the cavity (24) has an extension stretching under the at least one projection (23).
21. Fixing element according to one of the above claims, characterised by the fact that the cavity (24) on the circumferential area of the grommet (19) is open near the locking area (23.1).
22. Fixing element according to one of the above claims, characterised by the fact that the at least one projection is a circular-shaped projection (23) concentrically enclosing the grommet axis (AT).
23. Fixing element according to one of the above claims, characterised by the fact that the cavity (25) is formed by a section (20.1) of the grommet opening with an enlarged cross-section.
24. Fixing element according to one of the above claims, characterised by the fact that the grommet (19, 19a) is manufactured from an elastic rubber material, for example from rubber or an elastic rubber plastic.
25. Fixing element according to one of the above claims, characterised by the fact that the grommet (19, 19a) forms a further contact surface (21) axially distanced from the at least one locking area (23.1) and that the axial distance between these further contact surfaces (21) on the grommet side and the at least one

locking area (23.1) are at the most equal to or less than the axial distance between a first surface gripped from behind at the attachment or fixing hole (16) formed by the locking area (23.1) and a second surface formed at the attachment or fixing hole (16) which lies against the further contact surface on the grommet side (21).

26. Fixing element according to claim 25, characterised by the fact that the further contact surface on the grommet side is formed by a flange-like grommet section (21) projecting over the circumference of the grommet.
27. Fixing element according to one of the above claims, characterised by the fact that the grommet (19, 19a) is arranged without possibility of axial displacement on a peg (17) or section of peg (17.2) of the fixing element (13, 13a).
28. Fixing element according to claim 27, characterised by the fact that the grommet (19, 19a) is safeguarded by back cuts between the peg (17) and grommet (19, 19a) axially on the peg (17).
29. Fixing element according to claim 28, characterised by the fact that the peg (17) or the peg section (17.2) has at least one groove (18) to accept the grommet (19).
30. Fixing element according to one of the above claims, characterised by the fact that the volume (V24, V25) of the at least one cavity (24, 25) is at least equal to the volume (23) of the projection (23).

Summary

With a windscreen wiper system for motor vehicles with at least three connections or fixings at intervals from one another for screw-free installation of the windscreen wiper system on vehicle bodywork, the fixings consist respectively of a fixing element which can be pushed into an attachment or fixing hole where it can be anchored by engagement. At least one fixing element has a grommet in elastic material which can be inserted into the attachment or fixing hole, designed with at least one projection acting as a catch. In order to reduce the installation force, at least one cavity is arranged radially inwards in the area of and opposite the projection with reference to a grommet axis.

Fig. 2